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PLENARY SESSION 3-STRATEGIES AND RESPONSES

Automated Library Systems: What Next?

Carol Pitts Hawks

In a recent letter, Jonathan Waring of Collets referred to this as the "Monday morning graveyard slot." So while I'm very pleased to have been invited to speak to you today, I'm extremely pleased to see the number of you who actually made it to this meeting after last night's festivities!

In a presentation in 1985, Richard De Gennaro began by saying:

> The standard keynote speech at library technology conferences begins by describing, in glowing terms, the wonders of the new information processing technology and then exhorts the assembled company to embrace that technology or be left behind on the ash heap of the technological revolution.[1]

The pace of technological change and innovation is phenomenal. Technology that was state-of-the-art five years ago is inadequate today, and what is considered leading edge today will seem primitive in five years. As technology improves and costs go down, we librarians demand additional functions and capabilities, and our requirements and expectations are always one step ahead of what is currently available. Thus, the features and ideas proposed in this paper are functional requirements which are within reach, but not yet commonly available. I hope that when we look back on this paper in five years, these features will have become commonplace items in most systems.

Automated serials control systems have made significant strides in the last five to six years, but many still lack key features which arc fundamental to our success. On the acquiring side, our management report capabilities still fail us when any new wrinkle is introduced. On the cataloging side, we must grapple with rapidly multiplying formats and the need for bibliographic control and representation of items for which we provide access, but not ownership.

As background, let me begin by telling you what has been happening with library automation in the state of Ohio. I currently manage a combined acquisitions/serials department, which includes all traditional serials activities except serials cataloging and binding. My library is one member of the Ohio Library and Information Network, known as OhioLINK. OhioLINK will

link the seventeen state-supported university libraries in Ohio so that they will appear to the user as a single resource of approximately 19 million volumes. Each institution will have the same state-of-the-art integrated library system which feeds into a centralized database. Over the past two years, the OhioLINK network of committees completed a Request for Information, a Request for Proposal (with 3,000 + specifications), eight days of vendor demonstrations, and four site visits to the users of the four systems selected as finalists in the bid process. As a result, Innovative Interfaces was selected as the vendor for this project. These activities have provided a wealth of information on the current state of automated library systems.

My remarks today will synthesize my experiences as the chair of the Acquisitions/Serials Control Committee and as a member of the Site Visit Team to form an analysis of what is next for automated serials control.

Specifically, I will discuss five areas in which we should see major improvement in the 1990s: enhanced management reports, including serial cost projections; improved mechanisms for migration from one system to another; introduction of expert systems and artificial intelligence; external interfaces to vendor/publisher databases; and finally enhanced serials check-in including SISAC barcodes, a shared publication pattern database, control of new formats such as electronic journals, and issue-level records of vendor performance.

ENHANCED MANAGEMENT REPORTS

First let's examine management reports. Recent events in serials publishing, pricing, automation, and the economic climate have made librarians' decision-making processes far more difficult and also more critical to our continued ability to fulfill our mission. Published cost studies of serials prices, for example, are useful for general trends in publishing, but are of limited use in actual budget projection, since they reflect data on costs in a selected geographic area or a selected group of titles monitored from year to year. Each library's mix of titles is unique enough to make the variations from published data significant. In order to predict accurately the cost of serial title renewals in a given library, automated systems must provide accurate data and analysis.

Economic pressures are also increasing the demand for a diversity of local management reports. Data collection based on factors such as publisher, subject, and country of publication coupled with serial expenditure is routinely being requested. Reports that combine classification with costs require linkages between cataloging and acquisition files.[2] While the audit/security trails in most systems ensure the provision of accurate data, the sophisticated analysis needed is not uniformly available.

Carol Chamberlain has discussed the need for management reports that calculate average prices of books and serials by subject categories and project expenditure based on average prices, actual expenditures, and average inflation rates.[3] And Jean Houghton has highlighted one of the fundamental difficulties with using data from automated systems for cost projection.

> For projection purposes, what is important is consistency. Not whether an invoice is paid in July or November, but whether it is paid on the same basis every year. Successful projection also depends on a large enough statistical pool to blur inconsistencies, or a small enough pool to do an item by item check.[4]

However, these difficulties can be surmounted by a system which can prepare serial

renewal cost projections by individual title. For each title, the program calculates projected costs using previous payment data and percentage increases. Individual variations based on data such as country of publication and payment history can be accommodated. The most sophisticated program has been available on the original Geac system; plans indicate that the program will be carried over to the Geac Advance System. The program recently released by Innovative Interfaces provides comparative data by fund, but not by individual title.

To clarify further, I will explain the Geac version in more detail and suggest some minor improvements. The report predicts an estimated cost for renewal of a title based on past invoices/expenditures, plus an inflation factor. In a more sophisticated system, the inflation factor could be adjusted based on variables such as country of publication, fund, or subject classification. The method used would weigh the most recent invoice patterns more heavily than older trends. By dividing the invoice history into periods and determining the increase/decrease between periods, a prediction would be made with the most recent change given twice the weight of changes in older periods. The simpler Innovative Interfaces program analyzes the payment history by fund for two designated time periods in the aggregate. Individual title information is not given. Instead, librarians can use this report to evaluate the renewal cost increases (after invoicing) for all chemistry titles as a group. Both of these reports are major steps forward in budget prediction and analysis. We can, and should, expect the number of management report programs to increase in number and in sophistication. Thus, the crystal ball we've been using up to this point might gel just a bit clearer.

MIGRATION FROM ONE SYSTEM TO ANOTHER

Let's turn now to improved mechanisms for migration from one system to another. Much of the acquisitions literature in the 1980s was devoted to selecting and implementing an automated system. Libraries in the 1990s and beyond will be faced with migration to a second generation system. The library profession's emphasis and insistence on adherence to bibliographic standards will stand us in good stead for such transitions. However, acquisitions/serials control systems are based on fewer standards; the USMARC Format for Holdings has not been adopted by systems vendors as uniformly as the MARC Format for Bibliographic Data. Libraries with fully implemented serials control systems will have concerns in a number of areas: transferring fixed field data that has no equivalent in the new system, migrating variable length field data such as free text notes, and, most significantly, loading serial check-in parameters, frequency data, and publication patterns in non-standard format.

Once a library has completed the tedious and costly process of converting bibliographic, holdings, and check-in parameter data into an automated system, it would be difficult to justify the labor costs involved in a second conversion. In the OhioLINK environment, we included specifications to provide for the automated conversion of these records to the new system. Beyond this essential conversion, Jean Houghton has coined the phrase "payment system migration" for the process of electronically moving payment histories from one system to another.[5] The ability to transfer these histories would allow continued information analysis for collection management without having to wait the requisite number of years to rebuild payment data into the new system. Currently this type of conversion would require custom programming.

INTRODUCTION OF EXPERT SYSTEMS AND ARTIFICIAL INTELLIGENCE

In some of the country's larger libraries, expert systems are beginning to move out of the prototype phase toward marketable products. Vendors in the acquisitions/serials control arena have been slow to investigate opportunities for this new technology. However, as more user-friendly tools for building expert systems become available, we can expect more applications. At least one application of artificial intelligence technology is currently being used for acquisitions. Pam Zager at Iowa State University has developed an expert system to assign vendors to monograph orders. The system is designed to enable a student assistant to assign vendors by identifying order characteristics, such as country of publication, which would affect vendor choice.

Expert system technology can also be used as a mechanism to control, assess, and analyze the mass of data available from the automated serials control system. For example, Carol Chamberlain has proposed an allocation formula that incorporates an academic profile including number of faculty, student enrollment, and degrees granted. The acquisitions/accounting system would generate an acquisitions profile based on payments, the rate of fund expenditure during the year, average prices, and comparison figures from the publishing industry. A selection profile would include requests for expensive purchases, requests for purchase based on circulation and interlibrary loan analyses, and collection policies.[6] Each of these profiles would interact in various ways depending on the question posed to the system.

Norman Desmarais extends Chamberlain's proposal by predicting the application of artificial intelligence techniques to large data-bases. Such applications "could facilitate collection development by suggesting titles for purchase, to develop profiles of buying patterns, or to produce selection lists."[7] Aveney suggests the possibility of programming a system to print titles for consideration only when they have received a predetermined number of reviews.[8]

In another article, Brian Alley proposes one of the most interesting and viable expert systems. His model includes a main menu that lists eight vendor databases, each of which is linked to the library's acquisitions/serials control system. The vendors are in priority order and the system automatically seeks out the top priority for the initial search. If the vendor cannot supply the title, the system automatically queries the next ranking vendor until the title is located and ordered. In this model the vendors also have the advantage of quick, effortless access to their databases, which in turn allows them to keep more items in stock.[9] I can only imagine how useful such a system would be for locating elusive serial back issues.

EXTERNAL INTERFACES TO VENDOR/PUBLISHER DATABASES

Alley's model fits well with my next area, external interfaces. The possibilities for interfacing are growing at a remarkable rate and the adoption of the X12 standard will only accelerate that growth. The databases of book vendors, subscription agents, back-issue dealers, and publishers are assaulting acquisitions/serials librarians on a daily basis. Optical disc and online products such as *Ulrichs' Plus* for title availability, *BT LINK* from Baker & Taylor for inventory availability, and *SerialsQuest* from Faxon for serial back issues are appearing in libraries as stand-alone tools, often in CD-ROM format. Greater integration of these tools with the library's automated system is an essential ingredient for future development.

We often think in terms of downloading between systems, but our sights should be set higher toward true integration. Such seamless integration results in simple, straightforward

movement from one database to another. For example, Carol Chamberlain[10] and Fred Lynden[11] have envisioned collection management workstations as a tool for selection in college and university research libraries. Such workstations would link administrative academic records, providing data on enrollment and subject emphasis to databases such as *Ulrichs' Plus* to determine existing literature in a field and its cost. We could extend this model to include online review of titles and sources, as well as online ordering. Desmarais predicts that separate discs for categories such as in-print material and serial issues will become obsolete. Instead we will be able to search multiple databases, making greater use of "hot keys" or macros to toggle out to other sources without disrupting work in progress.[12]

For example, Baker & Taylor's *BT LINK* provides inventory data updated weekly. Development of linkages with the library's automated system would allow the acquisitions clerk to locate a title in the database, toggle to the acquisitions system, load the data located in the vendor's record, generate the purchase order number, toggle back to the vendor's system, and enter an online order, effectively placing a hold on the book until it can be located and shipped.

Others have predicted the replacement of union lists with online links between article citations, journal holdings, and full text displays. "Ed Brownrigg has suggested that eventually the cataloging that publishers do to advertise titles in online searching and electronic buying systems will replace the cataloging done by libraries." [13] Additional possibilities include direct loading of standing order status reports into the local system and the online downloading of a checklist of issues that have been mailed.[14]

In summary, the next generation of systems could allow libraries to issue cancellations, claims, and orders to vendors without leaving their automated workstations. In response, vendors could acknowledge online the receipt of orders, claims, and cancellations. Status reports and responses to claims could be transmitted and recorded in the library's database without manual rekeying. The interfacing possibilities and the benefits to be realized from them are endless.

ENHANCED SERIALS CHECK-IN

The final area I would like to cover today is enhanced serials check-in. We have all waited for years for the development and acceptance of the SISAC barcode. This standard marks the beginning of a future which focuses on processing the contents of serials, rather than the container. Individual issue barcodes will allow cost-effective check-in by scanning and the elimination of input errors. Faxon representative Fritz Schwartz announced last July that Kluwer, Pergamon, and Elsevier had already begun printing the barcode on issues or had committed to provision of the barcode in the near future. In a recent *Newsletter on Serials Pricing Issues,* it was announced that Taylor & Francis, Wiley and the Royal Chemical Society had been added to this list. Although few automated system vendors have yet to incorporate the use of the barcode into their systems, it is safe to assume that the market will soon demand that vendors include this capability.

The era of electronic publishing is also upon us; the number of peer-reviewed electronic journals is growing steadily. Ohio State "mainstreams" these publications through the INNOVACQ system, creating traditional order and check-in records. The actual journal issues will be transmitted via the Internet and received in a generic mailbox for the Acquisition Department. The new skills required of staff will be knowledge of Internet protocols, e-mail procedures, and file transfer protocols. Once received, the issues will be transferred electronically to University Systems for access via the university's campuswide information system. Information such as enumeration will be recorded in the INNOVACQ system. I'm sure our next speaker will

provide more detailed information on these new methods of acquisition.

In other areas, new developments in serials control will make it possible to compile vendor performance statistics based on the check-in record. Acquisitions librarians have grown accustomed to vendor performance information for one-time orders generated from automated systems, but only issue level performance assessment will provide an accurate, on-going measure of service provided by the serials vendor.

Subscription maintenance will be enhanced by mechanisms which can detect when subscriptions are due to expire. Analysis of serials check-in parameters will alert clerks when titles need evaluation—these alerts will be activated based on receipt patterns. Finally, the serials publication pattern database proposed by Bonnie Postlethwaite would include "information used to describe the frequency of publication and the method of identifying each issue of a serial publication."[15] Such a database would have uses in claiming, binding, preservation, copyright, and resource sharing, to name just a few areas.

CONCLUSION

The future of automated library systems is increasingly bright. We can expect to see significant changes in management reports, improved mechanisms for migration between systems, the introduction of expert systems and artificial intelligence, external interfaces to other databases, and enhanced serials control and check-in. Existing library systems will serve as a firm foundation from which libraries can build for the future. Many of the very early growing pains are behind us, but the next steps will have their own dilemmas, turning points, and obstacles to be overcome. As Richard De Gennaro has said:

> The point is that our field thrives on visions. Some of those visions turn out to be pipe dreams; others . . . eventually become realities - one way or another. The fun and frustration of it all is that it is so hard to distinguish the pipe dreams from the prophetic visions. . . . Our task is to pool our knowledge so that we can do a better job of telling one from another.[16]

NOTES

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